CLAIMS

What is claimed is:

1. A spherical object (Automotive Ball) or disk-shaped object containing an array of electromagnets that are distributed close to the surface of the said object, the object also being equipped with auxiliary electronic circuits that facilitate the coordinated operation of the said electromagnets, such that the said object is capable of independent rolling, levitation, and descent motion as caused by magnetic interactions between the contained electromagnets and an external magnetic field(s).
2. The technology of claim 1, wherein the total spherical surface area of an automotive ball is subdivided into smaller sub-regions, each sub-region having an associated electromagnet(s) positioned beneath the sub-region, and the electromagnet(s) in each sub-region being controlled independently of electromagnets in other sub-regions, thereby permitting the transient magnetization (or de-magnetization) of a selected sub-region of an automotive ball's surface, without magnetizing (or de-magnetizing) non-selected sub-regions.
3. The technology of claim 2, wherein an automotive ball resting on a magnetic plane can be made to move by rolling on the magnetic plane, as motivated by magnetizing a sub-region(s) of the automotive ball's surface area that is located close to, but not at, the contact point between the automotive ball and the magnetic plane on which it rests, the automotive ball being thereby caused to roll in order to then bring its magnetized sub-region in contact with the attracting magnetic plane.
4. The technology of claim 2, wherein an automotive ball resting on a magnetic plane can be levitated above this magnetic plane when a subset of the said sub-regions is magnetized, thereby repelling the automotive ball from the magnetic plane, and/or attracting the automotive ball to another magnetic plane located above the first magnetic plane.
5. The technology of claim 2, wherein an automotive ball suspended above a magnetic plane can be motivated to descend toward this magnetic plane when a subset of the said sub-regions is magnetized, thereby attracting the automotive ball

toward the magnetic plane, and/or repelling the automotive ball from another magnetic plane located above the first magnetic plane.

6. The technology of claim 1, wherein an automotive ball is equipped with one or more embedded solar cells that can generate electricity to power the automotive ball.
7. The technology of claim 1, wherein an automotive ball is equipped with one or more embedded light-emitting diodes (LEDs) that provide light for the purpose of color coding the automotive ball so as to distinguish one automotive ball from another.
8. The technology of claim 1, wherein an automotive ball is equipped with optical fibers that extend from the exterior surface of the automotive ball to its interior and thereby can carry light back and forth between the two regions.
9. The technology of claim 1, wherein automotive balls function in a motion environment that provides the said external magnetic field(s) by means of one or more permanent magnets associated with one or more surfaces of the motion environment.
10. The technology of claim 9, wherein the motion environment is equipped with one or more light sources that illuminate the motion environment, thereby providing light energy to automotive balls in the motion environment.
11. The technology of claim 9, wherein the motion environment is filled with a liquid that has a density equal to the density of an automotive ball, such that an automotive ball neither sinks nor floats spontaneously in the liquid, the automotive ball being thereby effectively exempt from the force of gravity and moving only in response to interactions between magnetic fields generated by the automotive ball and an external magnetic field(s).
12. The technology of claim 9, wherein the said motion environment is equipped with a central computer that monitors and controls events and functions within the motion environment, those events and functions including the activity of automotive balls within the motion environment.

13. The technology of claim 12, wherein a motion environment and automotive balls contained therein are each equipped with an infrared or radio frequency (RF) transceiver circuitry that permits communication of data between the central computer of the motion environment and each automotive ball, and between automotive balls.
14. The technology of claim 13, wherein the said transceiver circuitry in each automotive ball transmits and receives data as carried by infrared light or RF waves, each automotive ball having its own set of unique, dynamically assignable transmission and reception frequencies.
15. The technology of claim 12, wherein a control pad or similar user-interface associated with the central computer of the motion environment permits a player(s) of an automotive ball game to direct the activity of game elements, including the three-dimensional navigation of automotive balls within the motion environment.
16. The technology of claim 1, wherein an automotive ball operating in transmission mode (AB_{TRANS}) generates fluctuating magnetic fields by controlled activation of its electromagnets.
17. The technology of claim 16, wherein an automotive ball operating in reception mode (AB_{RECEP}) can measure the strength of the said fluctuating magnetic fields generated by AB_{TRANS} when the fluctuating magnetic fields induce electric currents in the electromagnets of AB_{RECEP}, the measured strength of said fluctuating magnetic fields being inversely proportional to the distance d separating AB_{TRANS} and AB_{RECEP}, and thus can be used to calculate that distance d.
18. The technology of claim 17, wherein the electromagnets of AB_{RECEP} are electronically assigned unique three-dimensional (3D) spatial coordinates of the form (x_C,y_C,z_C) according to their non-changing, or constant, position relative to the center point of AB_{RECEP}, the center point of AB_{RECEP} having coordinates (0,0,0).
19. The technology of claim 18, wherein the position, in 3D space, of AB_{TRANS} is electronically calculated with respect to the coordinate system of AB_{RECEP}, the said calculated position being represented by the 3D variable (x_V,y_V,z_V), which is the

coordinates for the center point of AB_{TRANS} and is variable with relative motion of AB_{TRANS} to AB_{RECEP}.

20. The technology of claim 19, wherein the 3D variable (x_V,y_V,z_V) is electronically calculated according to a vector equation of the form

$$(x_V,y_V,z_V) = (2r + d)\,(x_C,y_C,z_C) \,/\, \sqrt{(x_C^2 + y_C^2 + z_C^2)},$$

r being the radius of AB_{TRANS} and AB_{RECEP}, d the calculated distance separating AB_{TRANS} and AB_{RECEP}, and (x_C,y_C,z_C) the electronically assigned 3D coordinates of an electromagnet(s) in AB_{RECEP} that measures the strongest magnetic field from AB_{TRANS}.